Log Event A

Borehole # 20-00-05

Borehole Information

Farm : B	**Tank :** B	**Site Number :** 299-E33-52
N-Coord : 45,176	**W-Coord :** 52,552	**TOC Elevation :** 655.07
Water Level, ft :	**Date Drilled :** 11/30/1944	

Casing Record

Type : Steel-welded	Thickness : 0.365	ID, in. : 10
Top Depth, ft. : 0	Bottom Depth, ft. : 153	
Type : Steel-welded	Thickness : 0.500	ID, in. : 12
Top Depth, ft. : 0	Bottom Depth, ft. : 53	

Borehole Notes:

This borehole was drilled in November 1944. A 12-in.-diameter casing was installed to a depth of 53 ft, and the borehole was completed to a depth of 153 ft with 10-in.-diameter casing. The 10-in. casing was perforated from a depth of 152 to 52 ft at a rate of six perforations per foot. Half a sack of cement was added to the bottom of the 10-in. casing.

The casing thickness is assumed to be 0.365 in. for the 10-in. casing and 0.406 in. for the 12-in. casing, based on the published thickness for schedule-40, 10-in. and 12-in. casing.

The top of the casing is the zero reference for the log. The casing lip is approximately 6 in. above the ground surface.

Equipment Information

Logging System : 1B	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 02/1997	**Calibration Reference :** GJO-HAN-14	**Logging Procedure :** P-GJPO-1783

Logging Information

Log Run Number :	1	**Log Run Date :**	08/20/1997	**Logging Engineer:**	Bob Spatz
Start Depth, ft.:	143.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	62.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	08/21/1997	**Logging Engineer:**	Bob Spatz
Start Depth, ft.:	63.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	0.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

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Logging Operation Notes:

This borehole was logged in two log runs. The total logging depth achieved by the SGLS was 143.0 ft.

Analysis Information

Analyst : S.D. Barry

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 04/09/1998

Analysis Notes :

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A casing correction factor for a 0.365-in.-thick steel casing (based on a 10-in., schedule-40 pipe) was applied to the interval between 50 and 143 ft. A casing correction factor for a 0.650-in.-thick steel casing was applied to the interval between the ground surface and 50 ft (the double cased portion of the borehole). The 0.650-in. correction factor was the nearest available correction factor for the double casing and does not fully account for the attenuation caused by this borehole configuration. This resulted in measured radionuclide concentrations between the ground surface and 50 ft that are less than actual.

Shape factor analysis was applied to the SGLS data and provided insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of the shape factor analysis results is included. The plot is used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.

Results/Interpretations:

The man-made radionuclides detected around this borehole were Cs-137 and Co-60. Cs-137 contamination was detected nearly continuously from the ground surface to 30.5 ft, 36 to 41 ft, 44.5 to 58 ft, at 85 ft, from 97 to 109 ft, and from 116.5 ft to the bottom of the logged interval (143 ft). Co-60 contamination was detected by the SGLS from 55 to 56 ft.

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The abrupt increase in the K-40 concentrations at 50 ft demarks the bottom of the double-cased interval and shows that the 12-in. casing was driven only to 50 ft, not 53 ft as indicated by the drilling log. The Th-232 concentrations are elevated from 53 to 61 ft. The K-40 concentrations increase to peak background levels between 54 and 61 ft, decrease to lower background levels at about 61 ft, then increase slightly at 70 ft and generally remain elevated to the bottom of the logged interval. The U-238 log plot shows an interval of elevated concentration values between about 62 and 77 ft that coincides with a change in log runs.

An analysis of the shape factors associated with applicable segments of the spectra was performed. Interpretations of the shape factor CsSF1 are contained in the Tank Summary Data Report for tank B-101.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank B-101.